

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P 20146 PC 00	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/NO 2003/000169	International filing date (day/month/year) 23.05.2003	Priority date (day/month/year) 11.06.2002
International Patent Classification (IPC) or national classification and IPC B04C 3/06, B01D 45/12, B04C 3/00, F22B 37/32		
Applicant FLOW DYNAMICS AS et al		

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 4 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
 - ☒ (sent to the applicant and to the International Bureau) a total of 1 sheets, as follows:
 - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

- This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

Date of submission of the demand 02.12.2003	Date of completion of this report 07.09.2004
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/NO 2003/000169

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☒ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages 1 - 4 _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* 1 _____ received by this Authority on 07.06.2004

pages* _____ received by this Authority on _____

☒ the drawings:

pages 1 _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing (specify): _____

☐ any table(s) related to the sequence listing (specify): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing (specify): _____

☐ any table(s) related to the sequence listing (specify): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/NO 2003/000169

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-3</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-3</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-3</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Documents cited in the International Search Report:

D1. GB 1127514 A

D2. EP 0203896 A2

D3. WO 9846328 A1

Amended claims have been filed on 7 June 2004 where new independent claim 1 comprises the features of originally filed claims 1 and 2 and the addition "that no gap exists between the rotational element (10) and the transitional part (4)".

New independent claim 1

D1 is considered to represent the closest prior art. From D1, (see figure 1 and page 2, line 40-100) an axial cyclone separator is known. The cyclone in D1 comprises an inlet pipe (at the top of figure 1), a transition part (2) and a downstream pipe (1). A rotational element (3) is located in the transitional part (2). The cross-sectional area of the downstream pipe is smaller than the cross-sectional area of the inlet pipe.

What differs between the invention according to new claim 1 and D1 is that the device according to the invention concerns separating fluid from a gas, where D1 teaches a device for separating particles from a gas. What further differs is that there is no gap between the rotational element and the transitional part, according to claim 1 of the invention.

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX V

The construction of D1, with its central rotational element based on a core cylinder, implies that no separation of fluid from gas can take place in D1, at least not a separation which solves the problems of the application, i.e. the creep problem and the increased pressure drop due to obstruction of the flow. Further, in D1 it is not mentioned or hinted at that the separator suits for separation of liquid droplets from gas. The above mentioned difference that no gap exists between the rotational element and the transitional part implies that no slip flow occur between the outer section of the rotational element and the cyclone body, which slip flow otherwise could decrease the efficiency of the separation process, as is the case in D1.

The differences between the invention according to claim 1 and D1, and the solutions these differences imply, are not considered to be obvious for a skilled person with the knowledge of D1.

Therefore, the invention according to claim 1 is novel and is considered to have an inventive step.

Thus, also claims 2 and 3 are novel and inventive.

D2 and D3 only represent the general state of the art.

The invention is industrially applicable.